

# **THE NATIONAL COASTAL MANAGEMENT PERFORMANCE MEASUREMENT SYSTEM**

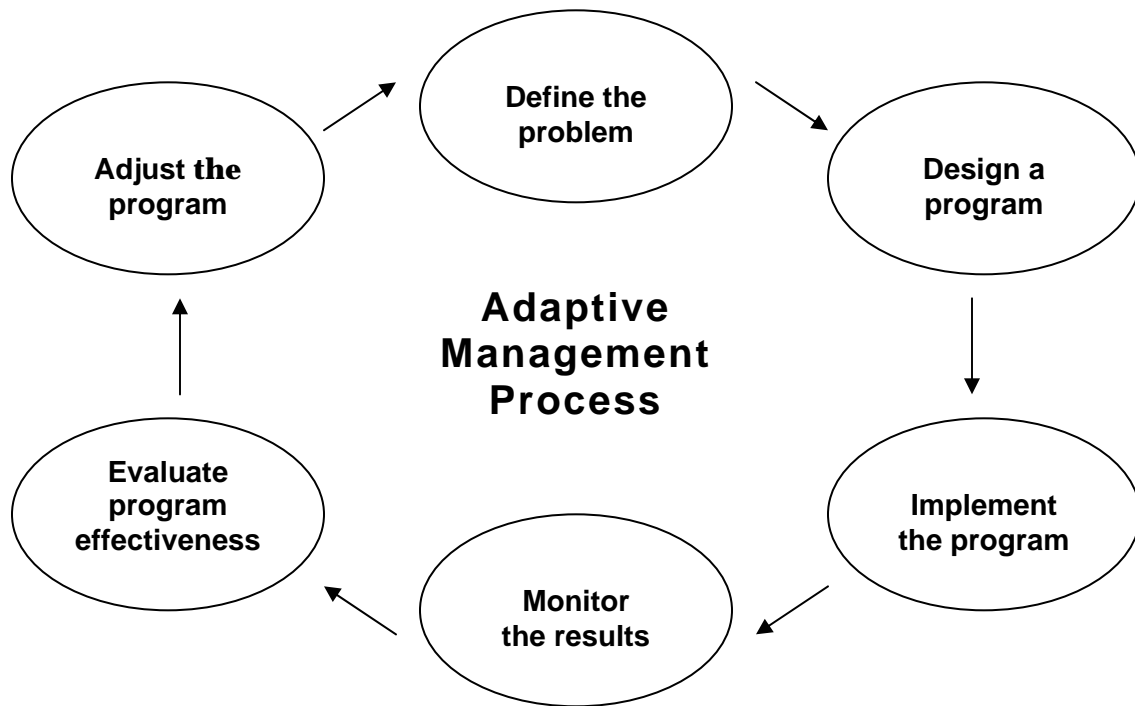
The National Coastal Management Performance Measurement System is part of an on-going effort by NOAA to work with coastal states to assess the effectiveness of the Coastal Zone Management Act (CZMA). The system is a consistent framework for regularly reporting on the progress in meeting the goals of the CZMA by the National Coastal Management Program (NCMP) and the National Estuarine Research Reserve System (NERRS).

The primary goal of this system is for NOAA to work with the states to track indicators of effectiveness of the coastal management programs and reserves at the national level. The system is designed to inform both federal and state coastal managers about the effectiveness of program actions within the context of the national objectives of the CZMA. Because state coastal resources and development challenges vary across the nation, and management programs and reserves are designed to meet state and local priorities, states are developing program specific indicators to supplement the national indicators. A secondary objective of this system is to provide relevant and applicable information for state and local management decisions.

## **A DESCRIPTION OF THE SYSTEM**

The National Coastal Management Performance Measurement System consists of a suite of performance indicators to track how well the states are achieving CZMA objectives and contextual indicators to track environmental and socioeconomic factors that influence program actions. This quantification of coastal management outcomes responds to Congressional requests for improved accountability and also facilitates adaptive management, enhances communication, and informs planning and resource allocation decisions by federal and state coastal managers.

NOAA has designed the National Coastal Management Performance Measurement System to use ecological, socio-economic, and management performance information in an adaptive management process (Fig. 1). Management activities should respond to trends in coastal conditions and adapt, if necessary, as more is learned about ecological and human processes affecting coastal resources. Adaptive management is a process that encourages observation and monitoring to adapt and improve natural resource management. Because there is uncertainty around how humans and the environment interact, the adaptive management process is designed to be flexible.



**Figure 1: Adaptive management feedback loop**

## HOW THE SYSTEM WORKS

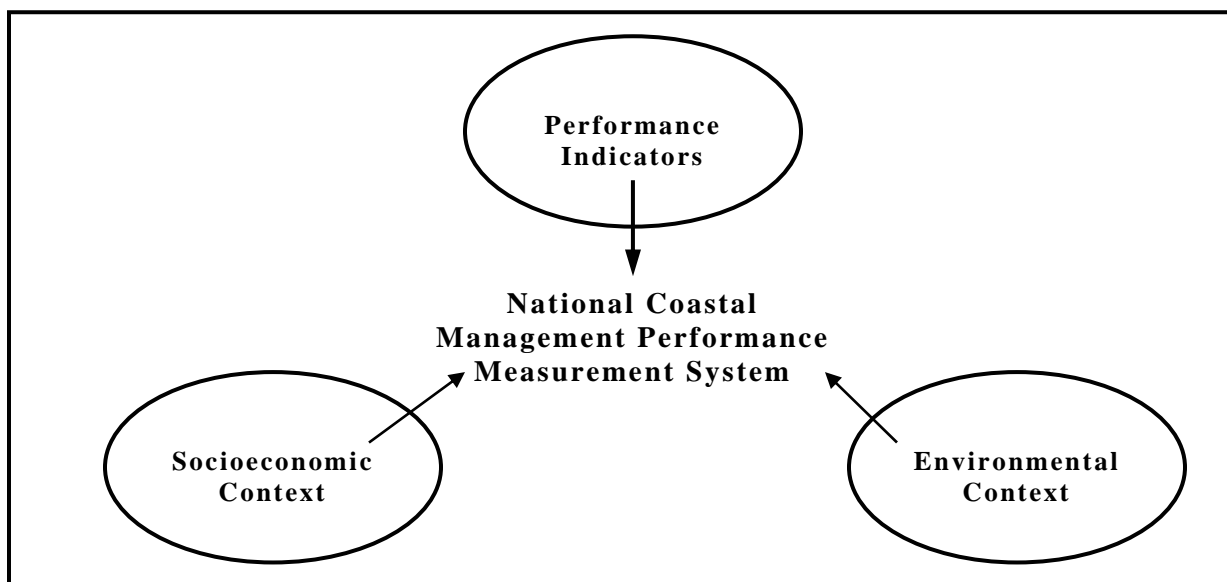
The National Coastal Management Performance Measurement System serves as a mechanism for quantifying the national impact of the CZMA by tracking and aggregating indicators of the effectiveness of the CZMA programs. An *indicator* is a parameter that provides a simplified view of a more complex phenomenon, or provides insight about a trend or event that cannot be directly observed. Indicators, when incorporated into a performance measurement system, can be used to both quantify change and to simplify complex information.

**Performance measures** include three components: indicators of performance, units of measure, and baseline information. Measurement units and baseline information are being determined during Phase I of implementation to craft performance measures. The baseline relevant to a selected indicator is established for each coastal management program and reserve based on an initial collection of data. The system will be tailored both to be relevant to individual coastal management program and reserve efforts and to be suitable for aggregating into regionally and nationally relevant information.

The system measures the on-the-ground results of coastal management through a combination of *performance indicators* and contextual information, referred to here as *contextual indicators*. The system primarily focuses on **outcome indicators**, or indicators that reveal changes in the state of coastal resources over time. A simple example of an outcome indicator is the number of public access areas acquired. To complement outcome indicators, the system also includes

**output indicators** to measure the goods and services that CZMA programs provide to influence outcomes. An example of an output indicator is the number of students and teachers participating in reserve education programs.

The system also incorporates **contextual indicators** that provide a more comprehensive picture of the environmental and socioeconomic circumstances that may greatly influence actions of the CZMA programs. Water quality, population, and development trends serve as examples of contextual indicators. NOAA recognizes that the CZMA programs may have little impact over these circumstances, but they can be very important to assessing effectiveness and influencing program performance. Contextual indicators may also be useful in identifying emerging issues and areas for further research and education. The environmental and socioeconomic contextual indicators in combination with performance indicators make up the National Coastal Management Performance Measurement System (Fig. 2).



**Figure 2: Diagram of the National Coastal Management Performance Measurement System**

## **PRODUCTS OF THE SYSTEM**

### **A. IMPROVED COMMUNICATION AND ACCOUNTABILITY**

To report information collected through the National Performance Measurement System, NOAA is producing three reports. While the initial reports on indicators may have data gaps, improvements in observation and monitoring programs and technologies will enable improvements in future reports. The three types of reports are:

1. An **annual CZMA funding summary** prepared by NOAA to document tasks, projects, and accomplishments achieved through funding provided to the National Coastal Management Program and the National Estuarine Research Reserve System.

*Inaugural summary: March 2004*

2. A **triennial performance measurement system report** compiled by NOAA to describe the trends in the data collected on the performance indicators. Depending on the specific priorities of different programs, some indicators may be aggregated by state or region while others may be aggregated nationally. Case studies and narrative explanations will supplement the indicator results to provide additional information on the accomplishments achieved and the challenges faced by CZMA programs.

*Inaugural report: July 2005 (Phase I only)*

3. A **triennial national state of the coast report** developed by NOAA and other federal agencies to document the status and trends of coastal and estuarine indicators, based on data and information from various federal agencies and state partners, to provide a comprehensive analysis of the natural, economic, and cultural resources of the coast.

*Inaugural report: December 2006*

## **B. ENHANCE EXISTING EVALUATION EFFORTS**

NOAA currently evaluates the performance and progress of coastal management programs and reserves in carrying out their approved programs, as provided by CZMA Sections 312 and 315. In addition to these periodic evaluations, each state undertakes a periodic assessment of the status of each area of national significance, as defined in CZMA Section 309, and each reserve updates its management plan every five years to address research, education, and resource management issues. While these existing evaluation methods provide useful information about program activities, tracking and reporting on-the-ground impacts is currently not a requirement of the CZMA and the information collected cannot be quantified to reflect the impacts. The performance measurement system will provide a mechanism to enhance existing evaluation tools to quantify the effectiveness and outcomes of the coastal management programs and reserves.

# **MEASURING THE EFFECTIVENESS OF THE NATIONAL COASTAL MANAGEMENT PROGRAM**

## **I. CONTEXTUAL INDICATORS**

**Importance** – Population growth, coastal development, pollution, port vitality, erosion, sea level rise, and demand for public access are but a few of the factors that affect coastal management decisions and exert pressure on the health of coastal ecosystems. Most pressures are associated with human activities that consume resources, modify habitat, or release pollutants. Contextual indicators describe or measure the pressures that directly or indirectly influence the condition of the environment and therefore influence the management strategies that can be developed in response. These indicators describe the environmental, social, and economic environment over which the coastal management programs have little or no control.

*Suggested Context Indicators -*

- Population in the coastal zone
- Employment in the coastal zone
- Coastal dependent employment
- Coastal dependent businesses
- Infrastructure investment in the coastal zone
- Water quality
- Endangered species identified in the coastal zone
- Invasive species identified in the coastal zone
- Area subject to coastal hazards
- Population subject to coastal hazards
- Coastal land cover change
- Habitat of particular concern, as identified by each state
- Type and quantity of commercial and recreational shellfish areas

## **PERFORMANCE INDICATORS**

### **A. COASTAL HABITATS**

***CZMA Section 303(2)(A)*** - “The protection of natural resources, including wetlands, floodplains, estuaries, beaches, dunes, barrier islands, coral reefs, and fish and wildlife and their habitat, within the coastal zone.”

***Importance*** - The CZMA recognizes that the coastal habitats of the United States support a significant and under-recognized element of this nation’s biological diversity, from the kelp beds of the Pacific Ocean to the salt marshes of the Atlantic. Coastal habitats also supply vital nutrients that support many terrestrial species, from shorebirds to commercial fisheries. Coastal habitats will be increasingly threatened by development, shoreline modification, and increased harvest pressure.

#### ***Suggested Performance Indicators*** -

- Coastal habitats mapped
- Habitat of particular concern impaired by human activity
- Habitat of particular concern restored
- Habitat of particular concern impacted by invasive species
- Coastal areas protected through acquisition
- Watershed or ecosystem management plans and/or programs

### **B. COASTAL HAZARDS**

***CZMA Section 303(2)(B)*** – “The management of coastal development to minimize the loss of life and property caused by improper development in flood-prone, storm-surge, geological hazard, and erosion-prone areas and in areas likely to be affected by or vulnerable to sea level rise, land subsidence and saltwater intrusion, and by the destruction of natural protective features such as beaches, dunes, wetlands, and barrier islands.”

**Importance** – The coastlines of the United States are vulnerable to a variety of natural hazards including tropical storms, hurricanes, flooding, shoreline erosion, tornadoes, and tsunamis. The impacts of natural hazards are becoming increasingly costly and devastating.

***Suggested Performance Indicators -***

- Coastal zone mapped for multiple hazards
- Setbacks or other locational requirements employed by state or local governments
- Communities with enhanced codes to reduce structural damage
- Communities with post-disaster redevelopment plans
- Communities designated as ‘disaster resistant’ or Project Impact

**C. COASTAL WATER QUALITY**

**Objective** – “The management of coastal development to improve, safeguard, and restore the quality of coastal waters, and to protect natural resources and existing uses of those waters.” (CZMA Section 303(2)(C))

**Importance** - Good water quality is essential for healthy coastal ecosystems and a healthy coastal economy. Poor water quality degrades coastal resources and can result in beach closures, consumption advisories on fish and shellfish, increases in harmful algal blooms, and loss of habitat and revenues from tourism.

***Suggested Performance Indicators -***

- Extent of Coastal Nonpoint Pollution Control Program implementation
- Closure of public beaches
- Closure of classified shellfish areas
- Presence and nature of beach monitoring programs

**D. COASTAL DEPENDENT USES**

**CZMA Section 303(2)(D)** – “Priority consideration being given to coastal-dependent uses and orderly processes for siting major facilities related to national defense, energy, fishery development, recreation, ports and transportation, and the location, to the maximum extent practicable, of new commercial and industrial developments in or adjacent to areas where such development already exists.”

**Importance** - Historically, coastal communities relied upon coastal-dependent uses of their shorelines, such as commercial fishing and shipping. Today, coastal-dependent uses are threatened with displacement and are giving way to non-coastal-dependent uses, such as residential development. Coastal dependency is clearest in the case of economic activities that must have access to coastal waters to function, such as commercial docks and facilities.

***Suggested Performance Indicators -***

- Planning/management mechanisms to place priority on coastal water dependent uses
- Planning/management mechanisms to place priority on major facilities related to defense, energy, fisheries, and ports

## **E. PUBLIC ACCESS**

**CZMA Section 303(2)(E)** – “Public access to coasts for recreation purposes.”

**Importance** - The growing use of existing coastal access facilities has also led to declining quality. New private development along the coast may block shoreline access while the numbers of residents and tourists wishing to use the shoreline is increasing.

### ***Suggested Performance Indicators*** -

- Access areas provided
- Accessways developed/improved
- States with access guides
- Quality of recreational experience

## **F. COASTAL COMMUNITY DEVELOPMENT**

**CZMA Section 303(2)(F)** – “Assistance in the redevelopment of deteriorating urban waterfronts and ports, and sensitive preservation and restoration of historic, cultural, and esthetic coastal features.”

**Importance** – Changing economic realities, deteriorating infrastructures, and the general lack of economic investment have taken their toll on traditional working waterfront communities. Without planning that considers ecological, cultural, historic, and esthetic values as well as the need for economic development, communities can be overwhelmed by development that is incompatible with their goals and needs.

### ***Suggested Performance Indicators*** -

- Open space acquired/protected
- Waterfront redevelopment plans/programs
- Restrictions on public investment in fragile or high hazard areas

## **G. GOVERNMENT COORDINATION AND DECISION-MAKING**

**CZMA Section 303** – The goals of improved government coordination and decision-making were incorporated throughout Section 303 of the CZMA. **Section 303(2)(G)** - "the coordination and simplification of procedures in order to ensure expedited governmental decision-making ... "; **Section 303(2)(J)** - "assistance to support comprehensive planning, conservation, and management ... and improved coordination between State and Federal coastal zone management agencies and State and wildlife agencies"; **Section 303(4)** - "to encourage the participation and cooperation of the public, state, and local governments, and interstate and other regional agencies, as well as the Federal agencies having programs affecting the coastal zone ... "; and **Section 303(5)** - "to encourage coordination and cooperation with and among the appropriate Federal, state, and local agencies ... in collection, analysis, synthesis, and dissemination of coastal management information, research results, and technical assistance ...."

**Importance** – Improved planning, resource allocation, enforcement of environmental policies, and the development of partnerships to address management needs at the local, state, and national levels will provide access to governmental decision-making for all stakeholders.

***Suggested Performance Indicators -***

- Approved Coastal Management Programs
- Approved Coastal Nonpoint Source Pollution Control Programs
- Approved National Estuarine Research Reserves
- Approved Coastal and Estuarine Land Conservation Program plans
- Special Area Management Plans implemented
- Type and nature of permitting programs that apply in the coastal zone
- Permits issued
- Projects reviewed for federal consistency
- Assistance to local governments
- Partnerships with local governments, agencies, and other institutions
- Publications developed/distributed
- Participants in workshops
- Public awareness
- Public meetings held or persons attending
- Participation in stewardship programs
- Research undertaken or supported

## **MEASURING THE EFFECTIVENESS OF THE NATIONAL ESTUARINE RESEARCH RESERVE SYSTEM**

### **CONTEXTUAL INDICATORS**

***Suggested Pressure Indicators:***

- Population change and development trends
- Climate change and variability
- Extreme weather events
- Nutrient loading
- Invasive species introduction
- Public lack of knowledge about the function and importance of estuaries

***Suggested State Indicators:***

- Land cover
- Habitat distribution
- Habitat quality
- Abiotic water quality
- Weather monitoring
- Nutrient levels
- Biological monitoring
- Public polling data



## **PERFORMANCE INDICATORS**

### **GOAL 1 - IMPROVE COASTAL DECISION MAKING BY GENERATING AND TRANSFERRING KNOWLEDGE ABOUT COASTAL ECOSYSTEMS**

**CZMA Section 315 (b)(2)(C)** – “Designation of the area as a reserve will serve to enhance public awareness and understanding of estuarine areas.”

**CZMA Section 315 (c)** - “The Secretary shall develop guidelines for the conduct of research within the system that shall include (1) a mechanism for identifying and establishing priorities among the coastal management issues that should be addressed through coordinated research within the system.”

#### ***Suggested Performance Indicators -***

- Habitats and ecological conditions monitored and characterized
- Advanced understanding of local conditions through research staff projects
- Level of use of reserves by outside researchers and Graduate Research Fellows
- Number of new estuarine technologies and scientific tools being tested in the reserves
- Participation in estuarine ecosystem analysis (i.e., habitat change analysis)
- Increase in education programs offered for students, teachers, general public
- Increased awareness of estuarine function and importance
- Increased use of science based information in coastal decision-making by participants in the Coastal Training Program

### **GOAL 2 - ENHANCE AND EXPAND THE NATIONAL ESTUARINE RESEARCH RESERVE SYSTEM**

**CZMA Section 315 (b)(2)(A)** – “The Secretary may designate an estuarine area as a national estuarine reserve if the area is a representative estuarine ecosystem that is suitable for long term research and contributes to the biogeographical and typological balance of the system.”

**CZMA Section 315 (e)(1)(i) & (ii)** – “The Secretary may make grants for purposes of acquiring lands, for purposes of managing a reserve and constructing appropriate reserve facilities.”

#### ***Suggested Performance Indicators -***

- Amount of functional habitat restored in reserves
- Number of reserves functioning with an up-to-date management plan
- Increase in acres protected by reserves
- Number of reserves operating with facilities that are adequate to promote research, education and stewardship programs
- Number of new reserves designated consistent with NERRS policy of biogeographic and typological representation

### **GOAL 3 - INCREASE AWARENESS, USE, AND SUPPORT OF THE RESERVE SYSTEM AND ITS ESTUARINE SCIENCE, EDUCATION, AND STEWARDSHIP PROGRAMS**

**CZMA Section 315 (b)(c)** – “Designation of the area as a reserve will serve to enhance public awareness and understanding of estuarine areas...”

**CZMA Section 315 (d)** – “The Secretary shall take such action as is necessary to promote and coordinate use of the system for research purposes...”

***Suggested Performance Indicators -***

- Number of outside scientists using reserves for conducting estuarine research
- Number of journal articles, news articles, and other publications featuring reserve education and research programs
- Number of state and local officials visiting reserves each year
- Number of conferences and events where reserve science and education is presented

## **SHORT-TERM IMPLEMENTATION**

A phased approach is being used to implement a National Coastal Management Performance Measurement System. Phase I of NCMP implementation uses a pilot study approach to implement a majority of the performance indicators in eight states. States participating in Phase I are refining and evaluating the suggested contextual and performance indicators. The NERRS is phasing in its indicators over time, with Phase I limited to indicators with known data available. Both the NCMP and NERRS implementation of the performance measurement system will expand consistent with resource availability.

This limited scope approach allows the National Coastal Management Performance Measurement System to be further refined and finalized. The goals of Phase I are to:

- develop and submit to Congress the first annual summary of CZMA funding;
- identify how indicators could be used;
- identify potential sources of data and delineate data collection responsibilities between coastal management programs, reserves, and NOAA;
- refine data collection and reporting methods;
- assess the compatibility of reported data when aggregated among coastal management programs and reserves; and
- identify resources needed to support federal and state efforts to implement the system; collect and evaluate data, identify gaps, and complete reporting requirements for developing a synthesized picture of national progress on a routine basis.

## **CONCLUSION**

The success of the National Coastal Management Performance Measurement System may depend on resources to allow NOAA and the coastal states to create a new system to measure performance within the CZMA partnership. With strong support, the National Coastal Management Performance Measurement System will become a powerful tool for the management of the nation’s coastal zone and for demonstrating the success of the CZMA in preserving, protecting, and restoring coastal resources and sustaining coastal communities throughout the United States for this and future generations.